

PROF. CLEVELAND ABBE.

THE death of Cleveland Abbe near Washington, D.C., on October 28, in the seventy-eighth year of his age, makes a gap of a special character in the ranks of meteorologists, and particularly among those who use the English language. From 1871 until August last, when he retired, Abbe was professor of meteorology in the United States Weather Bureau. That is the title which the bureau gives to the professional meteorologists on its staff. Born and educated in New York, he had been a teacher of mathematics in New York and of engineering at the State University, Ann Arbor, Michigan. From there he went to Harvard University, 1860-64, being at the same time aid in the U.S. Coast Survey under B. A. Gould; thence to the Central Observatory of the Russian Meteorological Service at Petrograd for two years; aid in the U.S. Naval Observatory, 1867-68, and director of the Cincinnati Observatory, 1868-73.

The work at the Weather Bureau for which he is best known is the editing of the *Monthly Weather Review*, which was in his charge from 1893 until his retirement, with a break of a few years from 1909, during which the Bulletin of Mount Weather Observatory took its place. Besides original papers, it includes the best monthly epitome of progress in meteorology in English, and ranks for that purpose with the *Meteorologische Zeitschrift*. This work gave Abbe an unrivalled knowledge of meteorological literature. He was a sort of college-tutor for the Weather Bureau, and with his encyclopædic knowledge he was to a large extent the force behind the organisation. He was a very keen advocate of the study of dynamical meteorology. Every student of the subject knows his collections of translations into English of classical papers in French and German which are published by the Smithsonian Institution. He founded a meteorological library at Johns Hopkins University and was professor of meteorology in the George Washington University of Washington. He was specially the promoter of meteorology. We owe to his instigation the installation by the Meteorological Office of the station now in operation at St. Helena. He wrote a large volume on the Maryland Weather Service, with a discourse upon aims and methods. That represents his interest. In an article in the "Encyclopædia Britannica" it is the observation of clouds at sea that claims attention. He took part in a number of scientific expeditions for eclipses and other purposes, and he started the reform in civil time, reckoning by even hours from the Greenwich meridian, a reform which in Europe has over-shot itself into "summer-time."

Abbe's services to meteorology were recognised by the Royal Meteorological Society by the award of the Symons Medal in 1912. He was a man of most genial disposition. His wife, the daughter of W. G. H. Percival, of St. Kitts, whom he

married in 1909, survives him. One of the sons of his first marriage, Cleveland Abbe, junior, succeeds him as editor at the Weather Bureau.

NAPIER SHAW.

NOTES.

OFFICIAL information has been received from Paris that from January 1, 1917, the millibar (1000 C.G.S. units) will be used in the publications of the Bureau Central Météorologique for atmospheric pressure, instead of the millimetre of mercury. The same unit has been in use in the publications of the British Meteorological Office since the beginning of 1914; the Colonies of British Guiana and Mauritius have already adopted the unit, and it has also been used in some of the publications of the Weather Bureau of the United States, of Harvard University (Blue Hill Observatory), and of Berkeley University, California. The question raised by Prof. McAdie, of Blue Hill, as to whether the proper name for the unit is not a "kilobar" has still to be considered, on the ground that the name "bar" was already appropriated by chemists to mean 1 dyne per sq. cm. It is one of the questions which should have been discussed at an international meeting projected for September, 1914.

AN interesting discussion took place in the House of Lords on Wednesday, December 20, on a motion by Lord Sudeley requesting H.M. Government to take the steps necessary to provide funds to enable the Imperial Institute to carry out its functions adequately and completely. Lord Sudeley pointed out that, although the institute's work is of great importance in connection with the war and with the development of the resources of the Empire, and though these services have been publicly acknowledged in various ways, yet the institute is greatly hampered in its work by want of funds. The motion was supported by Lord Rathcrendon, who gave some examples of the institute's work, and emphasised the need for more funds and more space in order that full advantage may be taken of the organisations which the institute has developed for the investigation of the resources of the Empire and the dissemination of information regarding them. Viscount Haldane, whilst in sympathy with the motion, pointed out that so far as research is concerned care must be taken to secure co-operation with the work of the Advisory Council for Scientific and Industrial Research, as otherwise confusion might arise. In his reply Lord Islington gave an account of the developments which have taken place at the Imperial Institute since the passing of the new Management Act eight months ago. Committees are being appointed by the various Dominions and Colonies to consider their needs and interests, and the special committee for India has been requested by the Government of India to undertake an important inquiry into the possibility of increasing the usage of Indian raw materials within the Empire. A number of technical committees has also been formed to advise with regard to investigations and other work on minerals, timbers, silk, rubber, etc. The Executive Council also hopes to work in close co-operation with the newly established Department of Scientific and Industrial Research, especially in those cases where more purely scientific investigation is needed. The question of funds is being carefully considered, and the Executive Council of the institute intends to approach the Government in due course with a statement of needs, in order that the work may be maintained and, as opportunity offers, developed. It is hoped that further support

will be forthcoming from the Dominions, Colonies, and India, which already provide the larger part of the funds available to the institute.

By the death of Mr. F. W. Levander the British Astronomical Association loses one of its most retiring and yet most useful members. Mr. Levander was for many years on the staff of University College School, then in Gower Street. His duties in this connection were too onerous to allow him much time for the practical pursuit of astronomy, in which science he always took a deep interest; but so early as 1860 he described, in "Recreative Science," vol. ii., p. 212, his detection of markings on the surface of Mars with an object-glass only $1\frac{1}{2}$ in. in diameter. In 1899 he presented to the Royal Astronomical Society a discussion of the colours of 4984 stars as described by various observers, with the special purpose of reducing such descriptions to a uniform scale; and in 1891 he described, before the British Astronomical Association, an instrument which he had devised—the star chroma-scope—for obtaining definite measures of star colours. But it is to his work in connection with the literature of astronomy that his colleagues in the science owe most to Mr. Levander. He was an original member of the British Astronomical Association, and in 1895, when the association had accumulated the nucleus of a library, he became librarian, and administered this department for twelve years. In 1900 he was elected editor of the *Journals and Memoirs* of the association, a post that he fulfilled most efficiently until his death. While editor he drew up a complete index to the first eighteen volumes of the journal of the association, having some years earlier prepared a similar index to the volumes of the *Astronomical Register*. In 1906 he was elected president of the association, and held the chair for the customary period of two years. Mr. Levander died on December 20, after a very short illness, aged seventy-seven. He was interred at the Hampstead Cemetery, Fortune Green, on December 23.

THE attention given in the Press to the sudden death, on December 15, of Prof. Hugo Münsterberg is due much less to his scientific eminence than to his notorious activities as a pro-German propagandist in the United States. Born at Dantzic in 1863, he took his doctorate in philosophy at Leipzig and in medicine at Heidelberg, and began his teaching career as a *Privat-dozent* at Freiburg-im-Breisgau. While engaged in this University he produced his first considerable work, "Die Willenshandlung" (1888), described by William James as "a little masterpiece," and commenced the publication of the "Beiträge zur experimentelle Psychologie," of which the "Grundzüge der Psychotechnik" may be regarded as the completion. In 1892 James, who admired the acuteness and vigour of "the irrepressible young Münsterberg," invited him to come to Harvard as first director of the psychological laboratory—the forerunner of institutions that have become specially characteristic of American universities. His success as a lecturer and publicist led him to write a series of English works dealing in a semi-popular way with the applications of psychology to law, medicine, education, and the problems of society and industry. The last books of this series were a "Business Psychology" (1915) and a study of the "Photoplay" (1916). While these works undoubtedly did much for the popularisation of psychology, and contain matter of considerable value, they have scarcely added to their author's reputation as a man of science. His last serious book in English, "Psychology, General and Applied" (1914), is an extremely interesting exposition

of his psychological doctrine, in which the results of the modern experimental and the older philosophical methods were happily and ingeniously combined.

MR. R. PROTHERO, President of the Board of Agriculture, attended the first meeting of the War Emergency Committee of the Royal Agricultural Society of England, under the chairmanship of Mr. Adeane. He outlined the Government's proposals for increasing the production of food, and after his departure the committee passed the following resolutions, which are being forwarded to the Board of Agriculture:—(1) That this committee is of opinion that a price should not be fixed for any agricultural produce unless the cost of production is taken into consideration and unless the price of feeding stuffs, fertilisers, etc., is also fixed. The committee questions the wisdom of fixing prices, but in the event of the price of wheat being fixed at 60s. per quarter, the opinion of the committee is that the price of oats should be fixed at not less than 40s. per quarter. (2) The committee is of opinion that where spring sowing of wheat is undertaken care should be taken to ensure that the varieties used should be especially suitable for the purpose—such as Red Marvel, April Bearded, or, in districts where it is known to succeed, Red Fife. (3) The committee feels that the land of this country cannot be made to produce more food unless there be an increase in the supply and use of artificial manures. The manufacturer of these manures is dependent upon a larger amount of sulphuric acid being made available for the use of the makers of artificial manures, and the committee urges the Government to set free for the use of those manufacturers such acid as they may require. (4) The committee is of opinion that in view of the great difficulty experienced in obtaining artificial manures in this country, the Government be requested to prohibit the export of sulphate of ammonia and basic slag, except to our Colonies, until the requirements of agriculturists in this country have been met.

THE King has conferred the honour of knighthood upon the Very Rev. John Herkless, principal of the University of St. Andrews.

MR. F. J. H. MERRILL, State geologist of New York from 1890 to 1893, has died at Los Angeles at the age of fifty-five. For the last three years he had been field-assistant to the California State Mining Bureau.

DR. HJALMAR ÖHRVALL is retiring from the chair of physiology at Uppsala University, having entered his sixty-sixth year on December 15.

THE astronomical institute of Lund University has at last obtained the seismograph for which it prepared an underground chamber two years ago.

THE removal of the natural history collections from the building of the Swedish Academy of Science in Drottninggatan, Stockholm (see *NATURE*, November 30, p. 255), has afforded temporary accommodation therein for the ethnographical collections, which have long had wholly insufficient lodging. Prof. C. V. Hartman intends to make the most of the eight months' tenancy promised him. When the public sees a larger selection from these valuable stores it will surely insist on a suitable and permanent home for them.

IN this country, where many of our leaders in science have been amateurs, we do not always realise the rarity of such workers in some other countries or the difficulties met with by those who do exist. In Sweden, however, the number of serious amateur

workers in biology has so greatly increased of late years that a proposal has emanated from the University of Lund to hold, in one or other place, a yearly meeting at which professional biologists may be brought into closer personal relations with their amateur colleagues. The proposal is also supported by Prof. Lönnberg and others.

It is announced that a school of mothercraft will be opened in February. The scheme is intended for educated women wishing to complete their qualifications for posts as health visitors, superintendents of infant welfare centres, matrons of babies' homes, and the like. Mothers with babies will be resident, and students will have the care of them and be instructed in breast-feeding and in various methods of artificial feeding. The course will extend over nine months, of which the first five will be spent in routine nursery work, and the last four at infant welfare centres, home visiting, etc. The school, named the Marlborough School of Mothercraft, is under the presidency of the Duchess of Marlborough.

THE second meeting of the Society of Glass Technology was held on December 14, in the University of Sheffield, the president, Mr. W. F. J. Wood, in the chair. Dr. H. Frank Heath, secretary of the Department of Scientific and Industrial Research, addressed the meeting, pointing out the good services the society could render to the nation, and assuring it of the Government's interest and support. The remarkable developments that have taken place in the glass industry during the last two years were emphasised by an exhibition of various types of glass, including (1) scientific ware, (2) optical glass, (3) artistic glass, (4) miscellaneous exhibits. Many firms and private individuals sent collections for exhibition, and it was apparent that in chemical ware and other scientific glass there was no necessity to depend on German production in the future. Beautiful specimens of artistic glass, both ancient and modern, were shown, whilst there were several interesting and instructive exhibits of glasses illustrating the various effects met with in glass production.

A MEETING of makers and users of refractory materials was held in the Chemistry Theatre of the University of Manchester on Wednesday, December 13, and was well attended. Mr. A. Cliff occupied the chair, and practically all the important manufacturing centres were represented. The opinion was generally expressed that a technical society of some kind ought to be formed, and that it should emphasise the manufacturers' side and develop a close relationship with the users in the various industries, so that all may work together in harmony for the general good. After discussion, it was decided to form a special section of the Ceramic Society, which has its headquarters at Stoke-on-Trent. This section is to work independently of the parent body in electing its own officers and in the management of its own meetings, to be held in the different centres. A provisional committee was appointed, which met at Newcastle-upon-Tyne on Wednesday, December 20, to formulate a scheme for the election of officers, to consider what modifications of the rules of the Ceramic Society are necessary to suit the requirements of the new section, and to appoint a place for the next general meeting. It was decided to hold this meeting of the section at Leeds early in the new year, when Dr. J. W. Mellor, of Stoke-on-Trent, is to read a paper on "The Spalling of Magnesite Bricks."

A STUDY of the individual and sex differences resulting from fasting is reported by H. D. Marsh in the
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Psychological Review (vol. xxiii., No. 6). The writer and his wife undertook a fast of three weeks. During the first of the three weeks the food was gradually reduced from normal to very little; during the second no food was taken except about 600 c.c. of water daily; the third week reversed the procedure of the first week. The immediate effects of the fast, as shown by the tests, indicate a depletion of vitality and strength and to some extent a slowing down in the speed of activities, more for the motor than the mental. Some improvement in both sexes is shown in mental clearness and accuracy, and a most pronounced effect upon memory, disadvantageous for the masculine subject and advantageous for the feminine. It is certainly desirable that the ultimate effects of fasting upon both health and ability should be made the subject of definite study, and this article is interesting as an example stimulating to further inquiry. The sex differences found, though, may possibly prove to be individual rather than sexual.

THE Royal Anthropological Institute has been presented with a collection of fifty-nine photographs of Welsh Baptist ministers, dated about 1860-65. This collection was studied by the late Dr. John Beddoe, and notes have been made on each photograph with the view of determining the various types—Mediterranean, Kymric, Bronze, or Saxon—to which they belong. The question is discussed by Mr. H. J. Fleure in the December issue of *Man*, who pleads for contributions to a series which is likely to interest anthropologists.

IN spite of delay caused by the war and the loss of powerful supporters like Lord Ninian Crichton Stuart and Sir John Rhys, the National Museum of Wales is making steady progress, a considerable portion of the new buildings now approaching completion. The appeal of the court of governors for exhibits has been well responded to, but specimens are still much wanted to illustrate the geology and mineralogy of the Principality. The exhibition of Mr. E. Lovett's collection of dolls was very popular; the governors are now making arrangements for an exhibition to illustrate the methods of education adopted in bygone times, and an effort is being made to establish a collection of mining appliances, especially such as were used in the past, to illustrate the development of the Welsh mining industry. A special appeal is being made for assistance in carrying out these useful projects.

IN the Museum Journal of the University of Philadelphia for June, recently received, Mr. C. W. Bishop gives an account of his expedition to the Far East in search of specimens for the museum. In Japan he was permitted to inspect the Imperial treasury of the Shoshoin, a collection practically unknown to foreigners. It consists chiefly of the palace furniture of the Emperor Shomu, who reigned during the eighth century, when the capital of Japan was at Nara. The collection comprises a wide range of objects, many of Korean, Chinese, and even Persian or Roman-Syrian origin, and includes bows and arrows, swords, spears, javelins, a curious form of halberd with a blade shaped like a lambent flame—a type peculiar to this period—decorated boxes, collections of Buddhist *sutras*, masks used in sacred ceremonies, musical instruments, games, robes, shoes, banners, tapestries, jewelry, glassware, and many other articles of great artistic value. Nowhere else in the world does such a collection exist, in particular, containing objects of the T'ang and preceding Chinese dynasties. Early Korean art is nowhere represented with such completeness as in this plain log building in the quiet groves of Nara.

AN interesting paper "On Plotting the Inflections of the Voice," by Mr. B. Bradley, well known as a comparative philologist, appears in the University of California Publications in American Archaeology and Ethnology (vol. xii., No. 5). Vocal sounds, and more especially words, appeal to the ear with various inflections, such as "high" or "low," "rising" or "falling," etc., and the inflection, both as regards "pitch" and "duration," often gives a certain character and meaning to the word. This is indicated in many languages by the use of "accents," as in Greek. Mr. Bradley has investigated the nature of such inflections by a new method, unlike the usual methods of the registration of sounds by those interested in phonetics. Recognising that an inflection is determined by pitch and duration, he registers vocal sounds by Rousselot's apparatus, and then he plots on co-ordinate paper, by an ingenious and most laborious method, the curve obtained by an examination of pitch and duration. The result is, to take an illustration from the Siamese language, with which Mr. Bradley is acquainted, that certain curves represent a rise, or a circumflex (rising and falling), or a more uniform mesial movement, or depression, or falling, all of which can be recognised by the ear. The remarkable thing, however, is that when such curves are studied with care, and with appropriate corrections, variations (often slight) may be observed in the wave-like movement which are not recognised by the ear, and the sound heard conveys a definite meaning, with a wave form different from that of the same word with different inflections. Thus, in Siamese, the syllable *nā*, with a rising inflection, means *thick*; with a circumflex, *uncle* or *aunt*; with a middle, *ricefield*; with a depressed, *indeed*; and with a falling, *face* or *front*. Tonal inflections or modulations "are essential features of every spoken word" in such languages as Chinese. The paper is accompanied by interesting curves.

IN 1879 Capt. Kirby, of Gloucester, while fishing for cod and hake south of Nantucket, brought up a new fish, which has been named *Lopholatilus chamaeleonticeps*. Since then, from time to time, other specimens of the fish, popularly known as the "tile-fish," have been obtained. In the *American Museum Journal* for November Mr. G. H. Sherwood describes an expedition in search of specimens. The flesh of the fish is said to resemble cod, and the remarkable discovery of a new edible fish seems likely to prove of some economic importance.

IN their third report on the improvement of indigo in Bihar (Agricultural Research Institute, Pusa, Bulletin 67, 1916) Mr. A. Howard and Mrs. Howard again insist that sound scientific cultivation is the first essential in the resuscitation of the natural indigo industry. Regarding "indigo wilt," they explain that, though cure be impossible, prevention, under intelligent treatment, is not difficult. The occurrence in the indigo plant of two "nitrogen cycles" makes the planter's task something more than the harvesting from a given area of a maximum crop, a given weight of leaf of which shall yield a maximum of indican. The chemical advice under which during recent years this, without due regard to the physiological characteristics of the plant, has been the grower's aim is unwittingly responsible for damage to the industry. Seed of single plants of a wild indigo, separately collected in Natal in 1913 for cultivation at Pusa, yielded a progeny more uniform than the Java indigo first introduced into Bihar in 1898. Colour, it is said, is thereby lent to the idea that Java indigo has arisen as a cross between the Natal plant introduced into Java three-quarters of a century ago and some species

formerly cultivated in Java. The identity of the latter species is not suggested, nor is it stated where in Natal the seed imported in 1913 was gathered. When, shortly after 1898, attempts to import Natal seed into Bihar were first made, no dye-yielding indigo could be found in Natal; the seed then secured was that of the Zulu indigo plant. All those engaged in the natural indigo industry will welcome this report and look forward with interest to further information from its authors on this important subject.

THE only part of the British Empire that can be looked upon as a producer of thorium minerals in quantities of economic importance is the island of Ceylon, and a good account of their occurrence and distribution will be found in the September Bulletin of the Imperial Institute (vol. xiv., No. 3). The minerals in question are monazite and thorianite, the former containing about 8 per cent. and the latter about 55 per cent. of thorium. The most profitable sources of the former appear to be certain of the beach deposits, where the monazite, together with much black sand, mainly ilmenite, has been concentrated by the action of the sea, whilst the thorianite is obtained from alluvial deposits in the river valleys, being often met with as a by-product in gem-mining operations. Both these minerals have been traced to their parent rocks, their main source being apparently pegmatite veins or lenses in granite, granulate, and charnockite. Up to the present none of these primary occurrences have been found sufficiently important to be capable of economic exploitation; the minerals capable of being worked to advantage are all obtained from clastic deposits, resulting from the degradation of the primary deposits and the subsequent concentration by natural causes of the material thus broken down.

THE meteorological observatory at the South Orkneys, founded by Dr. W. S. Bruce in 1903, is still being maintained by the Argentine Government. Mr. R. C. Mossman, who was in charge of the observatory for the first two years of its existence, contributes some notes to *Symons's Meteorological Magazine* for November (vol. li., No. 610) on the observations during 1915. The year was a remarkably cold one at the South Orkneys, the mean temperature (20.6° F.) being the lowest on record at the islands, and 3.4° below the average. In February, the warmest month, the mean temperature was 31.3°. Mr. Mossman points out that abnormally low temperatures were not prevalent during 1915 in the southern hemisphere; many observatories in middle latitudes showed mean temperatures above the normal. Other departures from the average conditions at the South Orkneys were the low rainfall and cloud amount, while the mean annual wind velocity was the lowest on record. These observations for 1915 will be of great value in conjunction with Sir Ernest Shackleton's observations further south in the Weddell Sea at the same time.

THE Meteorological Institute of the Netherlands has published a revised edition of the oceanographical and meteorological observations in the Indian Ocean for the months of September, October, and November, which completes the series for the year. The observations embodied are for the years 1856-1914. Results published by the English and French Meteorological Offices have been incorporated, and have added much to the value of the discussion. The work has been carried out under the superintendence of M. E. Van Everdingen, chief director of the Netherlands Meteorological Institute. The discussion is comprised in letterpress of 240 pages, which give the mean values of the principal meteorological elements for each single-degree square over the Indian Ocean. In a separate

volume charts are given for the several months of ocean currents and winds, also isobars and isotherms of air and sea, with routes, trajectories of cyclones, limits of fog, ice, and of the trade-winds and monsoons. For the charts the observations are in some cases grouped into 5° squares, and in others into 2° squares. The results are of a very high order owing to the large number of observations available over the greater part of the Indian Ocean, and the method of dealing with the observations is about all that could be wished. The data are limited solely to the sea, but probably in some cases land data might have been combined with advantage. In the pressure charts isobars are given for each 2.5 millimetres. There are numerous islands over the Indian Ocean at which long series of observations have been maintained; the entry and use of these stations would have enhanced the value of the work.

UNDER the joint auspices of the New York State Commission on Ventilation, the American Museum of Natural History, and the American Museum of Safety, an investigation of three of the best methods of determining the amount of dust in air has been carried out by Messrs. G. T. Palmer, L. V. Coleman, and H. C. Ward, and the results obtained are given in vol. vi. of the *American Journal of Public Health*. In the first of the methods investigated the dust-laden air is forced against a surface smeared with glycerine, and the number of dust particles caught by the glycerine on selected areas of the surface counted under the microscope. In the second method the air is drawn through syrup, which is afterwards diluted with water, a drop of which is placed in a shallow cell under the microscope, and a count made in the same way. In the third method the air is drawn through a spray or curtain of water, which is then examined under the microscope as in the second method. In the second and third methods a rough determination may be made by a comparison of the turbidity of the water with that of a series of prepared samples. The authors conclude that the water-spray method is the best and most convenient to use under normal conditions, and they give a number of directions as to the best way of carrying out the observations.

ACCORDING to the *Chemical Trade Journal* of December 9, the Secretary of the U.S.A. Department of Agriculture has decided to erect on the coast of southern California a Government plant for the production of potash from kelp. Unlike the private companies which are already manufacturing potash from this source, the Government is determined not only to produce the potash at the minimum cost, but also to conserve the nitrogen, iodine, and other by-products. In the Government plant the kelp will first be dried in a series of rotary driers. It will then be distilled in a modified coke-oven in such a way as to prevent the loss of the nitrogen, iodine, and other by-products. The potash salts will be dissolved with water out of the resulting charcoal, which may afterwards be used as fuel. The combustible gas obtained by the distillation may also be used as fuel. The U.S.A. Government experts hold that by such economical methods the process can be made to pay in ordinary times.

We have received from Messrs. Dulau and Co., Ltd., their December catalogue of botanical and natural history works. It is classified under botany and horticulture; orchids and orchid culture; mammals, birds, and reptiles; entomology; mollusca, and periodical publications. Many rare and out-of-print books are included. We notice that a set of *NATURE* from 1869 to 1907 is listed at a low price.

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OUR ASTRONOMICAL COLUMN.

MERCURY AN EVENING STAR.—Mercury will be at its greatest elongation east on the morning of January 3, and visible on several evenings before and after that date over the W.S.W. horizon about $\frac{3}{4}$ h. or 1h. after sunset. The planet will be visible to the unaided eye should the atmosphere be very clear at the important time, though this apparition will not be so favourable as the one which will occur on April 24 next. Between about December 28 and January 10 next Mercury will set about $1\frac{1}{2}$ hours after the sun, and, with good weather conditions, the ruddy, scintillating light it emits ought to be detected without difficulty, though it will be at a very low altitude.

TOTAL ECLIPSE OF THE MOON.—This phenomenon will take place on the morning of January 8, and the following are the astronomical times of its various stages:—

	January 7
	h. m.
Moon enters penumbra ...	16 36
Moon enters shadow ...	17 50
Beginning of total eclipse ...	19 0
Middle of eclipse ...	19 45
End of total eclipse ...	20 29
Moon leaves shadow ...	21 39
Moon leaves penumbra ...	22 53

Magnitude of eclipse = 1.369 (moon's diameter = 1.0).

At Greenwich the moon sets at 20h. 10m., while the moon is totally eclipsed. The various phases of the event may therefore be watched until after the middle of the eclipse. It will be interesting to observe whether the earth's shadow proves a very dark or light one on this occasion. At some lunar eclipses the disc of our satellite has remained quite bright, at others it has been scarcely visible at all. It usually happens that, at the time of a lunar eclipse, the atmosphere is sufficiently favourable to allow successful observation.

LONG-PERIOD VARIABLE STARS.—A valuable contribution to the investigation of variable stars was recently made by the Rev. T. E. R. Phillips, in a presidential address to the British Astronomical Association (*Journ. B.A.A.*, vol. xxvii., p. 2). Observational data for such stars have been much extended by the carefully determined light-curves of twenty-one long-period stars observed by the members of the Variable Star Section of the association, and by sixty-seven light-curves published in the *Harvard Annals*. Mr. Phillips has analysed the curves of eighty stars, and from a comparison of the phases of the second and third harmonics he finds that the long-period variables fall into two distinct groups. This grouping is supported by the evidence of the ranges of variation, and, in a somewhat less degree, by the coefficients, brightness, and periods. The general characteristics of the two classes are also shown in the light-curves. In Group I. the intervals from maximum to minimum, and from minimum to maximum, are not very unequal, and there is a tendency for the curve to show a pause on the rise. In Group II. there is a sharp rise to maximum, followed by a long period of decline. As a rule it is possible to determine the group to which a star belongs by mere inspection of the light-curve, but harmonic analysis is necessary to fix its place in the group. The stars of Group I. are brighter than those of Group II., and it is possible that they may be found to include "giants" and "dwarfs" respectively. The inequalities in the intervals between successive maxima, and in the brightness at different epochs, call for much further investigation.